

*Commercial/Industrial Vapor Intrusion Model*

***Groundwater Industrial Benzene***  
25 years at 219 days per year

## DATA ENTRY SHEET

GW-ADV  
Version 3.0; 02/03

Reset to  
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES   
OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial  
Chemical groundwater  
CAS No. conc.,  
(numbers only, C<sub>w</sub>  
no dashes) (µg/L)

71432 2.40E+03

ENTER Depth  
Average soil/  
groundwater  
temperature,  
T<sub>s</sub>  
(°C)  
below grade  
to bottom  
of enclosed  
space floor,  
L<sub>f</sub>  
(cm)

Depth  
below grade  
to water table,  
L<sub>wrt</sub>  
(cm)

Chemical  
Benzene

ENTER ENTER ENTER  
Totals must add up to value of L<sub>wrt</sub> (cell G28)

Thickness  
of soil  
stratum A,  
h<sub>A</sub>  
(cm)

Thickness  
of soil  
stratum B,  
h<sub>B</sub>  
(cm)

Thickness  
of soil  
stratum C,  
h<sub>C</sub>  
(cm)

ENTER Depth  
Soil stratum  
directly above  
water table,  
(Enter A, B, or C)

SCS soil type  
directly above  
water table  
(Enter A, B, or C)

ENTER Soil stratum A  
SCS soil type  
(used to estimate  
soil vapor  
permeability)

OR

ENTER User-defined  
stratum A  
soil vapor  
permeability,  
k<sub>v</sub>  
(cm<sup>2</sup>)

10 15 169

169 0 0

A S S

ENTER Stratum A  
SCS soil type  
Lookup Soil  
Parameters

ENTER Stratum A  
soil dry  
bulk density,  
p<sub>b</sub>  
(g/cm<sup>3</sup>)

n<sup>A</sup>  
(unitless)

ENTER Stratum A  
soil total  
porosity,  
n<sup>A</sup>  
(cm<sup>3</sup>/cm<sup>3</sup>)

θ<sub>w</sub>  
(cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum B  
SCS soil type  
Lookup Soil  
Parameters

p<sub>b</sub>  
(g/cm<sup>3</sup>)

n<sup>B</sup>  
(unitless)

ENTER Stratum B  
soil dry  
bulk density,  
p<sub>b</sub>  
(g/cm<sup>3</sup>)

θ<sub>w</sub>  
(cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum B  
soil total  
porosity,  
n<sup>B</sup>  
(unitless)

Lookup Soil  
Parameters

ENTER Stratum C  
SCS soil type  
p<sub>b</sub>  
(g/cm<sup>3</sup>)

n<sup>C</sup>  
(unitless)

ENTER Stratum C  
soil total  
porosity,  
θ<sub>w</sub>  
(cm<sup>3</sup>/cm<sup>3</sup>)

S 1.67 0.390 0.26

S 1.66 0.375 0.054

S 1.66 0.375 0.054

ENTER Enclosed  
space  
floor  
thickness,  
L<sub>crack</sub>  
(cm)

ENTER Soil-bldg.  
pressure  
differential,  
ΔP  
(g/cm·s<sup>-2</sup>)

L<sub>b</sub>  
(cm)

ENTER Enclosed  
space  
floor  
length,  
L<sub>b</sub>  
(cm)

ENTER Enclosed  
space  
floor  
width,  
W<sub>b</sub>  
(cm)

ENTER Floor-wall  
seam crack  
width,  
w  
(cm)

ENTER Indoor  
air exchange  
rate,  
ER  
(1/h)

ENTER Average vapor  
flow rate into bldg.  
OR  
Leave blank to calculate  
Q<sub>sol</sub>  
(L/m)

10 40 9638

9638 366 0.1 1.5

ENTER Averaging  
time for  
carcinogens,  
AT<sub>c</sub>  
(yrs)

ENTER Averaging  
time for  
noncarcinogens,  
AT<sub>NC</sub>  
(yrs)

ENTER Exposure  
duration,  
ED  
(yrs)

ENTER Exposure  
frequency,  
EF  
(days/yr)

ENTER Target  
risk for  
carcinogens,  
TR  
(unitless)

ENTER Target hazard  
quotient for  
noncarcinogens,  
THQ  
(unitless)

70 25 25 219 1.0E-05 1

Used to calculate risk-based  
groundwater concentration.

END

## DATA ENTRY SHEET

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_c$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Pure component URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Unit risk factor, RfC	Reference conc., RfC
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	5.89E+01	1.79E+03	7.8E-06	0.0E+00	

END

DATA ENTRY SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_b$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_{ig}$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Floor-wall seam perimeter, $X_{crack}$ (cm)
7.88E+08	154	0.130	0.321	0.321	0.614	9.92E-08	0.246	2.44E-08	17.05	0.39	0.137	0.253	38,552
Bldg. ventilation rate, $Q_{building}$ ( $\text{cm}^3/\text{s}$ )	Area of enclosed space below grade, $A_b$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ ( $\text{g}/\text{cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D_{eff,A}$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{eff,B}$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{eff,C}$ ( $\text{cm}^2/\text{s}$ )	Capillary zone effective diffusion coefficient, $D_{eff,\alpha}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{eff,T}$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)
1.42E+07	9.35E+07	4.12E-05	15	8,122	2.68E-03	1.15E-01	1.75E-04	6.65E-04	0.00E+00	0.00E+00	7.73E-04	6.66E-04	154
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D_{crack}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{crack}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RFC			
15	1.15E+02	0.10	2.37E+02	6.55E-04	3.86E+03	#NUM!	1.05E-05	1.21E-03	7.8E-06	NA			

END

## DATA ENTRY SHEET

## RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

## INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen ( $\mu\text{g/L}$ )	Indoor exposure groundwater conc., noncarcinogen ( $\mu\text{g/L}$ )	Risk-based indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Pure water solubility, S ( $\mu\text{g/L}$ )	Final indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.93E+03	NA	4.93E+03	1.79E+06	4.93E+03	NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL  
DOWN  
TO "END"

END

VLOOKUP TABLES

Soil Properties Lookup Table									Bulk Density	$\theta_w$ (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
SCS Soil Type	K <sub>s</sub> (cm/h)	$\alpha_s$ (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	$\theta_r$ (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )			
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay	
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam	
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam	
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand	
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand	
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay	
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam	
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt	
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay	
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam	
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam	
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam	

Chemical Properties Lookup Table															
CAS No.	Chemical	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>vap</sub> (cal/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RFC (mg/m <sup>3</sup> )	URF extrapolated (X)	RFC extrapolated (X)		
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.80E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04		
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	X	X
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01		
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04		
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01		
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02		
72569	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01		
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	X	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01		
75456	Trichlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03		
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00		
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02		
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00		
79345	1,1,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01		
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01		
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01		
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04		
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02		

## VLOOKUP TABLES

91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02	X
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	X
95476 o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	7.0E+00	X
95501 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	
95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	X
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	X
98822 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,586	0.0E+00	2.0E-03	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	
106934 1,2-Dibromoethane (ethylene dit)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	581.00	7,643	2.6E-05	0.0E+00	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	
108101 Methylisobutylketone (4-methyl-)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-01	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	X
120281 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	
126998 2-Chloro-1,3-butadiene (chlorop)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	6,288	3.0E-06	0.0E+00	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	
141784 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	X
542756 1,3-Dichloropropene	4.57E+01	6.28E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	

*Groundwater Industrial Naphthalene*  
25 years at 219 days per year

## DATA ENTRY SHEET

GW-ADV  
Version 3.0; 02/03

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES   
OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER  
Initial  
Chemical  
groundwater  
conc.,  
(numbers only,  
no dashes)  
C<sub>w</sub>  
( $\mu\text{g/L}$ )

91203

2.40E+03

Chemical

Naphthalene

ENTER Depth  
Average soil/ ground water  
temperature, T<sub>s</sub>  
(°C)

below grade to bottom of enclosed space floor, L<sub>f</sub>  
(cm)

ENTER Depth  
below grade to water table, L<sub>wr</sub>  
(cm)

ENTER ENTER ENTER  
Thickness of soil stratum A, (Enter value or 0)  
Thickness of soil stratum B, (Enter value or 0)  
Thickness of soil stratum C, (Enter value or 0)

h<sub>A</sub>  
(cm)

h<sub>B</sub>  
(cm)

h<sub>C</sub>  
(cm)

ENTER Soil stratum directly above water table, (Enter A, B, or C)

ENTER SCS soil type directly above water table

ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)  
OR  
User-defined stratum A soil vapor permeability, k<sub>v</sub> ( $\text{cm}^3$ )

ENTER Stratum A SCS soil type  
Stratum A soil dry bulk density, ρ<sub>b</sub>  
( $\text{g}/\text{cm}^3$ )

Lookup Soil Parameters

n<sup>a</sup>

(unitless)

ENTER Stratum A soil water-filled porosity, θ<sub>w</sub>  
Stratum B SCS soil type  
Stratum B soil dry bulk density, ρ<sub>b</sub>  
Stratum B soil total porosity, n<sup>B</sup>

Lookup Soil Parameters

θ<sub>w</sub>  
( $\text{cm}^3/\text{cm}^3$ )

(unitless)

ENTER Stratum B soil water-filled porosity, θ<sub>w</sub>  
Stratum B soil total porosity, n<sup>B</sup>

Lookup Soil Parameters

ENTER Stratum C SCS soil type  
Stratum C soil dry bulk density, ρ<sub>b</sub>  
Stratum C soil total porosity, n<sup>C</sup>

Lookup Soil Parameters

ENTER Stratum C soil water-filled porosity, θ<sub>w</sub>  
Stratum C soil total porosity, n<sup>C</sup>

ENTER Enclosed space floor thickness, L<sub>crack</sub>  
(cm)

ENTER Soil-bldg. pressure differential, ΔP  
( $\text{g}/\text{cm}\cdot\text{s}^2$ )

ENTER Enclosed space floor length, L<sub>b</sub>  
(cm)

ENTER Enclosed space floor width, W<sub>b</sub>  
(cm)

ENTER Enclosed space height, H<sub>b</sub>  
(cm)

ENTER Floor-wall seam crack width, w  
Indoor air exchange rate, ER  
(1/h)

ENTER Average vapor flow rate into bldg.  
OR  
Leave blank to calculate Q<sub>sol</sub> ( $\text{L}/\text{m}$ )

ENTER Averaging time for carcinogens, AT<sub>c</sub>  
(yrs)

ENTER Averaging time for noncarcinogens, AT<sub>nc</sub>  
(yrs)

ENTER Exposure duration, ED  
(yrs)

ENTER Exposure frequency, EF  
(days/yr)

ENTER Target risk for carcinogens, TR  
(unitless)

ENTER Target hazard quotient for noncarcinogens, THQ  
(unitless)

70 25 25 219 1.0E-05 1

Used to calculate risk-based groundwater concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, $D_a$ ( $\text{cm}^2/\text{s}$ )	Diffusivity in water, $D_w$ ( $\text{cm}^2/\text{s}$ )	Henry's law constant at reference temperature, $H$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at reference temperature, $T_R$ ( $^{\circ}\text{C}$ )	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ ( $\text{cal/mol}$ )	Normal boiling point, $T_b$ ( $^{\circ}\text{K}$ )	Critical temperature, $T_c$ ( $^{\circ}\text{K}$ )	Organic carbon partition coefficient, $K_{oc}$ ( $\text{cm}^3/\text{g}$ )	Pure water solubility, $S$ ( $\text{mg/L}$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) $\cdot$ ( $\text{mg}/\text{m}^3$ ) $^{-1}$	Reference conc., Rfc
5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	3.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_{te}$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_{rg}$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Floor-wall seam perimeter, $X_{crack}$ (cm)
7.88E+08	154	0.130	0.321	0.321	0.614	9.92E-08	0.246	2.44E-08	17.05	0.39	0.137	0.253	38,552

Bldg. ventilation rate, $Q_{building}$ ( $\text{cm}^3/\text{s}$ )	Area of enclosed space below grade, $A_b$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ ( $\text{g}/\text{cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D^{eff}_A$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D^{eff}_B$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D^{eff}_C$ ( $\text{cm}^2/\text{s}$ )	Capillary zone effective diffusion coefficient, $D^{eff}_{cz}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D^{eff}_T$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)
1.42E+07	9.35E+07	4.12E-05	15	12,913	1.52E-04	6.54E-03	1.75E-04	5.20E-04	0.00E+00	0.00E+00	5.92E-04	5.27E-04	154

Convection path length, $L_b$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D^{crack}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{crack}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Pelet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bidg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RFC
15	6.54E+00	0.10	2.37E+02	5.20E-04	3.86E+03	#NUM!	9.60E-06	6.27E-05	NA	3.0E-03

END

## RESULTS SHEET

## RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

## INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen ( $\mu\text{g/L}$ )	Indoor exposure groundwater conc., noncarcinogen ( $\mu\text{g/L}$ )	Risk-based indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Pure water solubility, S ( $\mu\text{g/L}$ )	Final indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.97E+04	7.97E+04	3.10E+04	NOC	NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.  
 NOC = NOT OF CONCERN. The groundwater conc. at or above the solubility limit is not of concern for this pathway.

SCROLL  
DOWN  
TO "END"

END

## VLOOKUP TABLES

SCS Soil Type	Soil Properties Lookup Table						Bulk Density			
	K <sub>s</sub> (cm/h)	$\alpha_1$ (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	$\theta_t$ (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	$\theta_w$ (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

CAS No.	Chemical	Chemical Properties Lookup Table										Unit risk factor, URF	Reference conc., RfC	URF extrapolated	RfC extrapolated
		Organic carbon partition coefficient, K <sub>OC</sub> (cm <sup>3</sup> /g)	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )		
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-03	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	X	X
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03		
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E-04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01		
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	X	
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01		
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02		
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01		
75014	Vinyl chloride (chloroethylene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00		
75252	Bromofrom	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	X	
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02		
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03		
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00		
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	X	
78933	Methylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02		
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00		
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01		
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	6,975	0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01		
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01		
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04		
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02		

## VLOOKUP TABLES

91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01
95476 o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	7.0E+00
95501 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01
95572 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.89E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	9.82E+01	2.39E-02	2.47E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01
106934 1,2-Dibromoethane (ethylene dit)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04
106991 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01
108101 Methylisobutylketone (4-methyl-)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.68E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03
120281 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02
126987 Methylacrylonitrile	3.56E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04
126998 2-Chloro-1,3-butadiene (chlorop)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	580	824	66400	0.0E+00	1.4E-02
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00
218019 Chrysene	3.98E+05	2.46E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04

*Soil Industrial Benzene*  
25 years at 219 days per year

## DATA ENTRY SHEET

SL-ADV  
Version 3.0; 02/03

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES   
OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES 

ENTER Initial  
Chemical soil  
CAS No. conc.,  
(numbers only,  
no dashes)  
 $C_R$   
( $\mu\text{g}/\text{kg}$ )

Chemical

71432 5.00E+01

Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor,	ENTER Depth below grade to top of contamination, if value is unknown)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown)
Average soil temperature, $T_s$ ( $^{\circ}\text{C}$ )	$L_f$ (cm)	$L_u$ (cm)

ENTER Totals must add up to value of $L_u$ (cell G28)		
Thickness of soil stratum A, (Enter value or 0)	Thickness of soil stratum B, (Enter value or 0)	Thickness of soil stratum C, (Enter value or 0)
$h_A$ (cm)	$h_B$ (cm)	$h_C$ (cm)

User-defined stratum A soil vapor permeability,  $k_v$  ( $\text{cm}^2$ )

OR

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, $\rho_d^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum A soil organic carbon fraction, $f_{oc}^A$ (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, $\rho_d^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B soil organic carbon fraction, $f_{oc}^B$ (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, $\rho_d^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C soil organic carbon fraction, $f_{oc}^C$ (unitless)
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Lookup Soil Parameters									
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MORE ↓

ENTER Enclosed space floor thickness, $L_{enc}$ (cm)	ENTER Enclosed space floor length, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^{-2}$ )	ENTER Enclosed space floor width, $W_s$ (cm)	ENTER Enclosed space height, $H_s$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{vol}$ ( $\text{L}/\text{m}$ )
--	--	--	---	---	--	--

10	40	9638.6	9638.6	366	0.1	1.5
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ENTER Averaging time for carcinogens, $AT_c$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{nc}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
--	--	-----------------------------------	--	--	---

70	25	25	219	1.0E-05	1
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Used to calculate risk-based soil concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure water solubility, S (mg/L)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Physical state at soil temperature, (S,L,G)
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	5.89E+01	1.79E+03	7.8E-06	0.0E+00	L

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $t$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{sf}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_g$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Initial soil concentration used, $C_R$ (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
7.88E+08	45	0.130	0.321	0.321	0.614	9.92E-08	0.246	2.44E-08	38,554	1.00E+00	1.42E+07

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,ts}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{ts}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{ts}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{ts}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D''_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D''_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D''_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D''_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)	Convection path length, $L_p$ (cm)
9.35E+07	4.12E-05	15	8,122	2.68E-03	1.15E-01	1.75E-04	6.55E-04	0.00E+00	0.00E+00	6.55E-04	45	15

Soil-water partition coefficient, $K_d$ (cm <sup>3</sup> /g)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation, $Pe^{(Pe)}$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Finite source $\beta$ term (unitless)	Finite source $\psi$ term (unitless)	Time for source depletion, $\tau_D$ (sec)	Exposure duration > time for source depletion, $(YES/NO)$
1.18E+00	8.56E+01	0.10	2.37E+02	6.55E-04	3.86E+03	#NUM!	NA	NA	6.75E+00	1.66E-08	1.16E+09	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Finite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Final finite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF	Reference conc., RFC
1.26E-05	NA	1.08E-03	1.08E-03	7.8E-06	NA

END

## RESULTS SHEET

## RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen ( $\mu\text{g}/\text{kg}$ )	Indoor exposure soil conc., noncarcinogen ( $\mu\text{g}/\text{kg}$ )	Risk-based indoor exposure soil conc.,	Soil saturation C <sub>sat</sub> ( $\mu\text{g}/\text{kg}$ )	Final indoor exposure soil conc.,
5.52E+03	NA	5.52E+03	2.40E+06	5.52E+03

## INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL  
DOWN  
TO "END"

END

## VLOOKUP TABLES

SCS Soil Type	K <sub>s</sub> (cm/h)	$\alpha_1$ (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	$\theta_r$ (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	Bulk Density (g/cm <sup>3</sup> )	$\theta_w$ (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098		0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079		0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061		0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049		0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053		0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117		0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063		0.029	1.63	0.146 Sandy Clay Loam
SI	1.62	0.00658	1.679	0.4044	0.489	0.050		0.0046	1.35	0.167 Silt
SICL	0.40	0.01622	1.321	0.2430	0.481	0.111		0.0039	1.38	0.216 Silty Clay
SIL	0.46	0.00839	1.521	0.3425	0.482	0.090		0.0056	1.37	0.198 Silty Clay Loam
SL	0.76	0.00506	1.663	0.3987	0.439	0.065		0.011	1.49	0.180 Silt Loam
	1.60	0.02667	1.449	0.3099	0.387	0.039		0.030	1.62	0.103 Sandy Loam

Chemical Properties Lookup Table																
CAS No.	Chemical	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure component diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (kJ/mol)	Unit risk factor, URF	Reference conc., RFC (mg/m <sup>3</sup> )	Physical state at soil temperature, (S,L,G)	URF extrapolated (X)	RFC extrapolated (X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	L		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	S	X	X
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	S		
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01	L		
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	S		
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	L		
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E-03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	L		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03	S		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	L		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00	L		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.59E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	S		
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	S	X	X
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	G		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02	L		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	L		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02	L		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	L		
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01	G		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	L		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	283.10	466.00	6,157	2.2E-06	9.0E-03	L		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	L		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	L		
75218	Ethyne oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00	L		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	L		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	L	X	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01	L		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01	L		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01	L		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01	L		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	L		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	L		
78131	1,1,2-Trichloro-1,2,2-trifluoroether	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	L		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03	S		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	L		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	L		
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	L	X	X
78933	Methyl ethyl ketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.56E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00	L		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	570.44	870.00	12,666	0.0E+00	1.4E-01	S		
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	L	X	X
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00	L		
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01	L		X
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	L		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	L		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	S		X
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01	S		X
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04	L		X
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02	L		X

## VLOOKUP TABLES

95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.80E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	L	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.08E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	L	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	L	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	L	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	L	
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	L	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	L	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	S,L	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.80E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	L	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	L	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	L	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	L	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	L	X
103651 n-Propylbenzene	5.82E+02	6.01E-02	7.83E-06	8.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	L	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,294	0.0E+00	1.4E-01	L	
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	L	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	9.70E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	S	
106934 1,2-Dibromoethane (ethylene dibr)	2.50E+01	2.17E-02	1.19E-05	4.16E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	L	
106950 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	L	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	L	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	L	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	L	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+00	2.09E-02	5.10E-04	25	345.65	519.13	7,801	0.0E+00	2.0E-01	L	
108101 Methylisobutyketone (4-methyl-2-	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	L	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	L	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	L	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	L	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.82E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	L	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	L	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	L	
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	L	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	L	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	L	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	S	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	S	
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	L	
123739 Crotonaldehyde (2-butene)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	L	
124481 Chlordibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,800	2.4E-05	7.0E-02	L	X
126987 2-Chloro-1,3-butadiene (chloroprene)	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-02	L	
127184 Tetrachloroethylene	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	526.00	8,075	0.0E+00	7.0E-03	L	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	S	
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	580	824	66400	0.0E+00	1.4E-02	S	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	L	X
141788 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	X	
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	L	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	L	
205992 Benz(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	S	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	S	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	S	
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	S	
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	L	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	L	
630206 1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	L	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	L	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	L	

*Soil Industrial Naphthalene*  
25 years at 219 days per year

## DATA ENTRY SHEET

SL-ADV  
Version 3.0; 02/03

YES   
OR

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to  
Defaults

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER Initial  
Chemical  
soil  
conc.  
CAS No.  
(numbers only,  
no dashes)  
 $C_R$   
( $\mu\text{g}/\text{kg}$ )

91203 5.40E+05

Chemical

Naphthalene

MORE  
↓

ENTER Depth  
below grade  
to bottom  
of enclosed  
space floor,  
Average  
soil  
temperature,  
 $T_s$   
(°C)  
 $L_f$   
(cm)

ENTER Depth below  
grade to top  
of contamination,  
Depth below  
grade to bottom  
of contamination,  
(enter value of 0  
if value is unknown)

ENTER ENTER ENTER  
Totals must add up to value of  $L_t$  (cell G28)  
Thickness of soil stratum A, (Enter value or 0) Thickness of soil stratum B, (Enter value or 0) Thickness of soil stratum C, (Enter value or 0)

ENTER Soil  
stratum A  
SCS  
soil type  
(used to estimate  
soil vapor  
permeability)

OR  
User-defined  
stratum A  
soil vapor  
permeability,  
 $k_v$   
( $\text{cm}^2$ )

10 15 60 189

60 0 0

S

MORE  
↓

ENTER Stratum A  
SCS  
soil type  
Stratum A  
soil dry  
bulk density,  
 $\rho_d^A$   
( $\text{g}/\text{cm}^3$ )

ENTER Stratum A  
soil total  
porosity,  
 $n^A$   
(unitless)

ENTER Stratum A  
soil water-filled  
porosity,  
 $\theta_w^A$   
( $\text{cm}^3/\text{cm}^3$ )

ENTER Stratum B  
SCS  
soil type  
Stratum B  
soil dry  
bulk density,  
 $\rho_d^B$   
( $\text{g}/\text{cm}^3$ )

ENTER Stratum B  
soil total  
porosity,  
 $n^B$   
(unitless)

ENTER Stratum B  
soil organic  
carbon fraction,  
 $f_{oc}^B$   
(unitless)

ENTER Stratum C  
SCS  
soil type  
Stratum C  
soil dry  
bulk density,  
 $\rho_d^C$   
( $\text{g}/\text{cm}^3$ )

ENTER Stratum C  
soil total  
porosity,  
 $n^C$   
(unitless)

ENTER Stratum C  
soil organic  
carbon fraction,  
 $f_{oc}^C$   
(unitless)

Lookup Soil  
Parameters

Lookup Soil  
Parameters

Lookup Soil  
Parameters

Lookup Soil  
Parameters

S 1.87 0.39 0.26 0.02

S 1.66 0.375 0.054

S 0.002

S 1.86 0.375 0.054 0.002

MORE  
↓

ENTER Enclosed  
space  
floor  
thickness,  
 $l_{enc}$   
(cm)  
Soil-bldg.  
pressure  
differential,  
 $\Delta P$   
( $\text{g}/\text{cm} \cdot \text{s}^2$ )

ENTER Enclosed  
space  
floor  
length,  
 $L_s$   
(cm)

ENTER Enclosed  
space  
width,  
 $W_s$   
(cm)

ENTER Floor-wall  
seam crack  
width,  
 $h_s$   
(cm)

ENTER Indoor  
air exchange  
rate,  
ER  
(1/h)

ENTER Average vapor  
flow rate into bldg.  
OR  
Leave blank to calculate  
 $Q_{vap}$   
( $\text{L}/\text{m}$ )

10 40 9638.6

9638.6

366 0.1 1.5

ENTER Averaging  
time for  
carcinogens,  
 $AT_c$   
(yrs)

ENTER Averaging  
time for  
noncarcinogens,  
 $AT_{nc}$   
(yrs)

ENTER Exposure  
duration,  
ED  
(yrs)

ENTER Exposure  
frequency,  
EF  
(days/yr)

ENTER

Target  
risk for  
carcinogens,

ENTER

Target hazard  
quotient for  
noncarcinogens,

ENTER

TR  
(unless)

ENTER

THQ  
(unless)

70 25 25 219

1.0E-05 1

Used to calculate risk-based  
soil concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Physical state at soil temperature, (S,L,G)
5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	3.0E-03	S

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_{te}$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_{rg}$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Initial soil concentration used, $C_R$ ( $\mu\text{g}/\text{kg}$ )	Bldg. ventilation rate, $Q_{building}$ ( $\text{cm}^3/\text{s}$ )
7.88E+08	45	0.130	0.321	0.321	0.614	9.92E-08	0.246	2.44E-08	38,554	1.00E+00	1.42E+07

Area of enclosed space below grade, $A_B$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,ts}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ ( $\text{g}/\text{cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D_{eff,A}$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{eff,B}$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{eff,C}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{eff,T}$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)	Convection path length, $L_p$ (cm)
9.35E+07	4.12E-05	15	12,913	1.52E-04	6.54E-03	1.75E-04	5.20E-04	0.00E+00	0.00E+00	5.20E-04	45	15

Soil-water partition coefficient, $K_d$ ( $\text{cm}^3/\text{g}$ )	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D_{crack}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{crack}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source $\beta$ term (unitless)	Finite source $\psi$ term (unitless)	Time for source depletion, $\tau_D$ (sec)	Exposure duration > time for source depletion (YES/NO)
4.00E+01	1.63E-01	0.10	2.37E+02	5.20E-04	3.86E+03	#NUM!	NA	NA	5.56E+00	2.50E-11	6.56E+11	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Final finite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RFC
1.37E-05	NA	2.23E-06	2.23E-06	NA	3.0E-03

**END**

## RESULTS SHEET

## RISK-BASED SOIL CONCENTRATION CALCULATIONS:

## INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C <sub>sat</sub> (µg/kg)	Final indoor exposure soil conc., (µg/kg)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.24E+06	2.24E+06	1.24E+06	NOC	NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL  
DOWN  
TO "END"

END

VLOOKUP TABLES

SCS Soil Type	Soil Properties Lookup Table						Bulk Density				SCS Soil Name
	K <sub>s</sub> (cm/h)	α <sub>t</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> )		
C	0.61	0.01496	1.253	0.2019	0.459	0.098		0.0092	1.43	0.215 Clay	
CL	0.34	0.01581	1.416	0.2938	0.442	0.079		0.016	1.48	0.168 Clay Loam	
L	0.50	0.01112	1.472	0.3207	0.399	0.061		0.020	1.59	0.148 Loam	
LS	4.38	0.03475	1.746	0.4273	0.390	0.049		0.040	1.62	0.076 Loamy Sand	
IS	26.78	0.03524	3.177	0.6852	0.375	0.053		0.044	1.86	0.054 Sand	
SC	0.47	0.03342	1.208	0.1722	0.385	0.117		0.025	1.63	0.197 Sandy Clay	
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063		0.029	1.63	0.146 Sandy Clay Loam	
SI	1.82	0.00658	1.679	0.4044	0.489	0.050		0.0046	1.35	0.167 Silt	
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111		0.0039	1.38	0.216 Silty Clay	
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090		0.0056	1.37	0.198 Silty Clay Loam	
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065		0.011	1.49	0.180 Silt Loam	
SL	1.60	0.02667	1.449	0.3099	0.387	0.039		0.030	1.62	0.103 Sandy Loam	

CAS No.	Chemical	Chemical Properties Lookup Table						Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Unit risk factor, URF conc., R/F C (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., R/F C (mg/m <sup>3</sup> )	Physical state at soil temperature, (S,L,G)	URF extrapolated (X)	R/C extrapolated (X)
		Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)								
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	L	
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	S	
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	S	X
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01	L	X
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	S	
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	L	X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	L	
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03	S	X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	L	
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00	L	
72435	Methoxychlor	9.77E+04	1.56E-02	4.48E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	S	X
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	880.38	15,000	9.7E-05	0.0E+00	S	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	G	
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02	L	
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	L	
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02	L	X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	480.40	5,879	8.3E-07	1.0E+01	L	X
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01	G	
75058	Acetonitrile	4.20E+00	1.28E-01	1.68E-05	1.00E+06	1.42E-03	3.45E-05	25	354.80	545.50	7,110	0.0E+00	6.0E-02	L	
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03	L	
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	L	
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	L	
75218	Ethyne oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00	L	
75252	Bromofom	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	L	X
75274	Trichlorodichromethane	5.50E+01	2.98E-02	1.06E-05	6.74E-03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	L	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01	L	
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01	L	
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01	L	
75455	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	389.30	4,836	0.0E+00	5.0E+01	L	
75894	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	L	
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	L	
76131	1,1,2-Trichloro-1,2,2-trifluoroether	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	S	
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03	S	X
77474	Hexachlorocyclopentadiene	2.00E+05	1.81E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	L	
78831	Isobutanol	2.59E+00	8.80E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	L	X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	L	X
78933	Methylmethylethane (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00	L	
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02	L	X
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	L	X
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00	L	
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	681.15	8,998	5.8E-05	2.1E-01	L	
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	L	
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	L	
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	S	X
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01	S	X
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04	L	
88722	o-Nitrotoluene	3.24E+02	5.87E-02												

## VLOOKUP TABLES

95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	L	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	L	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	L	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	L	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	L	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	L	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E-01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	L	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	S,L	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	L	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	L	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	416.31	636.00	8,737	0.0E+00	1.0E+00	L	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	L	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	L	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	L	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	680.50	9,290	0.0E+00	1.4E-01	L	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	L	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	S	
106934 1,2-Dibromoethane (ethylene dibr)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	L	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	L	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	L	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	L	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	591.00	7,786	6.8E-05	2.0E-03	L	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	L	
108101 Methylisobutylketone (4-methyl-2-	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	L	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	6,523	0.0E+00	7.0E+00	T	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	L	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	L	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.82E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	L	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	L	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	L	
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	L	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	L	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	L	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	S	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	S	X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	L	
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	L	
124481 Chlородибромометан	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	L	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	L	
126988 2-Chloro-1,3-butadiene (chloroprene)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	L	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00	L	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	S	X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	S	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	L	X
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	L	X
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	L	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	L	
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	S	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	S	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	S	X
319946 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	S	X
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	L	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	L	X
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	L	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	L	X
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	L	

***Appendix C***  
***Residential Vapor Intrusion Models***

## **Appendix C**

### **Residential Vapor Intrusion Scenario**

RHE values for the residential vapor intrusion scenario were developed consistent with the practices adopted for the other RHE scenarios. The two factors to develop for this exposure scenario were the exposure duration and the exposure frequency. The 208-day exposure frequency is based on the fraction of the time estimated to be spent at home in a 365-day year, adjusted for vacation, shopping and other personal and work related activities and the time that is spent indoors as opposed to outdoors. Considering that the expected residential use is new urban construction, this exposure frequency exceeds the reasonably anticipated time spent at home per year. An exposure duration of 9 years was selected based on survey results that showed that the typical homebuyer was found to have lived in their previous home between 4 and 7 years. The survey results indicate that the average tenure of home buyers is 7.1 years based on an overall residence history of the respondents (U.S. EPA, 1997). Nine years was selected as a representative value for the RHE. Thus, a residential exposure of 208 days per year for 9 years is appropriate for use as the RHE vapor intrusion scenario.

## Appendix C

### Vapor Control Efficiency Target Concentration Calculations Waukegan Manufactured Gas and Coke Plant Site

Chemical	J-E model output concentration	95% efficiency factor	Residential Vapor Intrusion Target Concentration
benzene			
soil (mg/kg)	0.12	÷ 0.05	= 2.4
groundwater (mg/L)	0.599	÷ 0.05	= 12.0
naphthalene			
soil (mg/kg)	141	÷ 0.05	= 2,820
groundwater (mg/L)	38.9	÷ 0.05	= 778

*Groundwater Residential Benzene  
without 3 ft additional soil cover*

GW-ADV  
Version 3.0; 02/03

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES   
OR

Reset to  
Defaults

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial  
Chemical groundwater  
CAS No. conc.,  
(numbers only,  
no dashes)  $C_w$   
( $\mu\text{g/L}$ )

71432 2.40E+03

Chemical

ENTER Depth  
Average soil/groundwater temperature,  $T_s$  ( $^{\circ}\text{C}$ )  
below grade to bottom of enclosed space floor,  $L_F$  (cm)  
Depth below grade to water table,  $L_{WT}$  (cm)

Benzene

ENTER ENTER ENTER  
Totals must add up to value of  $L_{WT}$  (cell G28)  
Thickness of soil stratum A,  $h_A$  (cm)  
Thickness of soil stratum B,  $h_B$  (cm)  
Thickness of soil stratum C,  $h_C$  (cm)  
(Enter value or 0) (Enter value or 0)  
(Enter value or 0)

ENTER ENTER  
Soil stratum directly above water table, (Enter A, B, or C)  
SCS soil type directly above water table

ENTER ENTER  
Soil stratum A SCS soil type (used to estimate soil vapor permeability)  
OR User-defined stratum A soil vapor permeability,  $k_v$  ( $\text{cm}^2$ )

MORE ↓  
ENTER Stratum A SCS soil type  
Stratum A soil dry bulk density,  $\rho_b^A$  ( $\text{g}/\text{cm}^3$ )  
Lookup Soil Parameters  
ENTER Stratum A soil total porosity,  $n^A$  ( $\text{unitless}$ )  
 $\theta_w^A$  ( $\text{cm}^3/\text{cm}^3$ )  
Lookup Soil Parameters  
ENTER Stratum A soil water-filled porosity,  $\theta_w^A$  ( $\text{cm}^3/\text{cm}^3$ )  
ENTER Stratum B SCS soil type  
Stratum B soil dry bulk density,  $\rho_b^B$  ( $\text{g}/\text{cm}^3$ )  
 $n^B$  ( $\text{unitless}$ )  
 $\theta_w^B$  ( $\text{cm}^3/\text{cm}^3$ )  
Lookup Soil Parameters  
ENTER Stratum C SCS soil type  
Stratum C soil dry bulk density,  $\rho_b^C$  ( $\text{g}/\text{cm}^3$ )  
 $n^C$  ( $\text{unitless}$ )  
 $\theta_w^C$  ( $\text{cm}^3/\text{cm}^3$ )  
ENTER Stratum C soil total porosity,  $n^C$  ( $\text{unitless}$ )  
ENTER Stratum C soil water-filled porosity,  $\theta_w^C$  ( $\text{cm}^3/\text{cm}^3$ )

S 1.67 0.390 0.26  
ENTER Enclosed space floor thickness,  $L_{crack}$  ( $\text{cm}$ )  
Soil-bldg. pressure differential,  $\Delta P$  ( $\text{g}/\text{cm} \cdot \text{s}^2$ )  
ENTER Enclosed space floor length,  $L_b$  (cm)  
ENTER Enclosed space floor width,  $W_b$  (cm)  
ENTER Enclosed space floor height,  $H_b$  (cm)  
ENTER Floor-wall seam crack width,  $w$  (cm)  
ENTER Indoor air exchange rate, ER (1/h)  
ENTER Average vapor flow rate into bldg.  
OR Leave blank to calculate  $Q_{sol}$  ( $\text{L}/\text{m}$ )

10 40 1000 1000 366 0.1 1.5

MORE ↓  
ENTER Averaging time for carcinogens, AT<sub>c</sub> (yrs)  
ENTER Averaging time for noncarcinogens, AT<sub>NC</sub> (yrs)  
ENTER Exposure duration, ED (yrs)  
ENTER Exposure frequency, EF (days/yr)  
ENTER Target risk for carcinogens, TR (unitless)  
ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

70 9 9 208 1.0E-06 1

Used to calculate risk-based groundwater concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	5.89E+01	1.79E+03	7.8E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_{\text{sf}}$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_g$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Floor-wall seam perimeter, $X_{\text{crack}}$ (cm)
2.84E+08	154	0.130	ERROR	ERROR	0.614	9.92E-08	0.246	2.44E-08	17.05	0.39	0.137	0.253	4,000

Bldg. ventilation rate, $Q_{\text{building}}$ ( $\text{cm}^3/\text{s}$ )	Area of enclosed space below grade, $A_B$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{\text{crack}}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,ts}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{ts}$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at ave. groundwater temperature, $H'_{ts}$ ( $\text{unitless}$ )	Vapor viscosity at ave. soil temperature, $\mu_{ts}$ ( $\text{g/cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D_{\text{eff}}^A$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{\text{eff}}^B$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{\text{eff}}^C$ ( $\text{cm}^2/\text{s}$ )	Capillary zone effective diffusion coefficient, $D_{\text{eff}}^{cz}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{\text{eff}}^T$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)
1.53E+05	1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	6.55E-04	0.00E+00	0.00E+00	7.73E-04	6.66E-04	154

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{\text{source}}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{\text{crack}}$ (cm)	Average vapor flow rate into bldg., $Q_{\text{cell}}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D^{\text{crack}}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{\text{crack}}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Pelet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{\text{building}}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RfC
15	1.15E+02	0.10	2.45E+01	6.55E-04	4.00E+02	#NUM!	2.53E-05	2.92E-03	7.8E-06	NA

END

**RESULTS SHEET**

**RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:**

Indoor exposure groundwater conc., carcinogen ( $\mu\text{g/L}$ )	Indoor exposure groundwater conc., noncarcinogen ( $\mu\text{g/L}$ )	Risk-based indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Pure water solubility, S ( $\mu\text{g/L}$ )	Final indoor exposure groundwater conc., ( $\mu\text{g/L}$ )
5.99E+02	NA	5.99E+02	1.79E+06	5.99E+02

**INCREMENTAL RISK CALCULATIONS:**

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

**SCROLL  
DOWN  
TO "END"**

**END**

VLOOKUP TABLES

SCS Soil Type	Soil Properties Lookup Table						Bulk Density			
	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

CAS No.	Chemical	Chemical Properties Lookup Table										Unit risk factor, URF	Reference conc., RfC	URF extrapolated (µg/m <sup>3</sup> )	RfC extrapolated (mg/m <sup>3</sup> )
		Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)				
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	1.8E-02	X
57749	Chlordane	1.20E+05	1.16E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04		
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03		
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01		
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04		
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01		
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03		
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02		
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.96E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02		
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	X	
75274	Trichlorodifluoromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	X	
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03		
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00		
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02		
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00		
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01		
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.36E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01		
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01		
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04		
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02	X	

## VLOOKUP TABLES

91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02	X
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	X
95476 o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,681	0.0E+00	7.0E+00	X
95501 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	
95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	
106934 1,2-Dibromoethane (ethylene dit)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	
108101 Methylisobutylketone (4-methyl-)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.36E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E+03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	
126998 2-Chloro-1,3-butadiene (chlorop)	8.15E+00	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	580	824	66400	0.0E+00	1.4E-02	
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	X
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	
630206 1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	

***Groundwater Residential Naphthalene  
without 3 ft additional soil cover***

## DATA ENTRY SHEET

GW-ADV  
Version 3.0; 02/03

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

Reset to  
Defaults

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER      ENTER  
Initial  
Chemical groundwater  
CAS No. conc.,  
(numbers only,  
no dashes)  $C_w$   
( $\mu\text{g/L}$ )

91203	2.40E+03
-------	----------

Chemical

Naphthalene

ENTER      ENTER      ENTER  
Depth      Depth      Depth  
Average below grade      below grade      below grade  
soil/ to bottom      of enclosed      to water table,  
groundwater space floor,      stratum A,  
temperature,      T<sub>s</sub>      L<sub>f</sub>      L<sub>wrt</sub>  
(°C)      (cm)      (cm)

10	15	169
----	----	-----

ENTER      ENTER      ENTER  
Thickness      Thickness      Thickness  
of soil      of soil      of soil  
stratum A,      stratum B,      stratum C,  
(Enter value or 0)      (Enter value or 0)      (Enter value or 0)  
 $h_A$        $h_B$        $h_C$   
(cm)      (cm)      (cm)

169	0	0
-----	---	---

ENTER      ENTER  
Soil stratum A      SCS soil type  
stratum directly above water table,      directly above water table  
(Enter A, B, or C)      (Enter A, B, or C)

A	S
---	---

ENTER      ENTER  
User-defined stratum A      soil vapor permeability,  
stratum A      OR       $k_v$   
SCS soil type      (cm<sup>2</sup>)

S	
---	--

ENTER      ENTER      ENTER      ENTER      ENTER      ENTER  
Stratum A      Stratum A      Stratum A      Stratum A      Stratum B      Stratum B  
SCS      soil dry      soil total      soil water-filled      SCS      soil dry  
soil type      bulk density,      porosity,      porosity,      soil type      bulk density,  
Lookup Soil       $\rho_b^A$        $n^A$        $\theta_w^A$       Lookup Soil       $\rho_b^B$        $n^B$   
Parameters      (g/cm<sup>3</sup>)      (unitless)      (cm<sup>3</sup>/cm<sup>3</sup>)      Parameters      (g/cm<sup>3</sup>)      (unitless)

S	1.67	0.390	0.26	.	.	.	.	.	.	.	.
---	------	-------	------	---	---	---	---	---	---	---	---

ENTER      ENTER      ENTER      ENTER      ENTER      ENTER  
Enclosed      Enclosed      Enclosed      Enclosed      Enclosed      Indoor  
space      space      space      space      space      air exchange  
floor      floor      floor      floor      seam crack      rate,  
thickness,      length,      width,      height,      width,      ER  
 $L_{crack}$        $L_b$        $W_b$        $H_b$        $w$       (1/h)  
(cm)      (cm)      (cm)      (cm)      (cm)     

10	40	1000	1000	366	0.1	1.5
----	----	------	------	-----	-----	-----

ENTER      Average vapor flow rate into bldg.  
Target vapor flow rate into bldg.  
OR  
Leave blank to calculate  
 $Q_{sol}$   
(L/m)

--

ENTER      ENTER      ENTER      ENTER      ENTER      ENTER  
Averaging      Averaging      Exposure      Exposure      Target      Target hazard  
time for      time for      duration,      frequency,      risk for      quotient for  
carcinogens,      noncarcinogens,      AT<sub>c</sub>      EF      carcinogens,      noncarcinogens,  
AT<sub>NC</sub>      (yrs)      (yrs)      (days/yr)      TR      THQ  
(yrs)      (yrs)      (yrs)      (unitless)      (unitless)

70	9	9	208	1.0E-06	1
----	---	---	-----	---------	---

Used to calculate risk-based groundwater concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_b$ (°K)	Critical temperature, $T_c$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Pure component water solubility, $S$ (μg/m <sup>3</sup> ) <sup>-1</sup>	Unit risk factor, URF	Reference conc., RfC (mg/m <sup>3</sup> )
5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	3.0E-03	

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_{te}$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_g$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ ( $\text{cm}^3/\text{cm}^3$ )	Floor-wall seam perimeter, $X_{crack}$ (cm)
2.84E+08	154	0.130	ERROR	ERROR	0.614	9.92E-08	0.246	2.44E-08	17.05	0.39	0.137	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ ( $\text{cm}^3/\text{s}$ )	Area of enclosed space below grade, $A_B$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,ts}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{ts}$ (atm· $\text{m}^3/\text{mol}$ )	Henry's law constant at ave. groundwater temperature, $H'_{ts}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{ts}$ ( $\text{g}/\text{cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D_{eff,A}$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{eff,B}$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{eff,C}$ ( $\text{cm}^2/\text{s}$ )	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{eff,T}$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)
1.53E+05	1.06E+06	3.77E-04	15	12,913	1.52E-04	6.54E-03	1.75E-04	5.20E-04	0.00E+00	0.00E+00	5.92E-04	5.27E-04	154

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D^{crack}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{crack}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Pelet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RfC
15	6.54E+00	0.10	2.45E+01	5.20E-04	4.00E+02	#NUM!	2.07E-05	1.35E-04	NA	3.0E-03

END

## RESULTS SHEET

## RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen ( $\mu\text{g/L}$ )	Indoor exposure groundwater conc., noncarcinogen ( $\mu\text{g/L}$ )	Risk-based indoor exposure groundwater conc., ( $\mu\text{g/L}$ )	Pure component water solubility, S ( $\mu\text{g/L}$ )	Final indoor exposure groundwater conc., ( $\mu\text{g/L}$ )
NA	3.89E+04	3.89E+04	3.10E+04	NOC

## INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.  
NOC = NOT OF CONCERN. The groundwater conc. at or above the solubility limit is not of concern for this pathway.

SCROLL  
DOWN  
TO "END"

END

VLOOKUP TABLES

Soil Properties Lookup Table							Bulk Density		
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>t</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	(g/cm <sup>3</sup> )	SCS Soil Name	
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	0.215 Clay	
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	0.168 Clay Loam	
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	0.159 0.148 Loam	
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62 0.076 Loamy Sand	
S	26.78	0.03524	3.177	0.6862	0.375	0.053	0.044	1.66 0.054 Sand	
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63 0.197 Sandy Clay	
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63 0.146 Sandy Clay Loam	
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35 0.167 Silt	
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38 0.216 Silty Clay	
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37 0.198 Silty Clay Loam	
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49 0.180 Silt Loam	
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62 0.103 Sandy Loam	

Chemical Properties Lookup Table												
CAS No.	Chemical	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant at reference temperature, H <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	URF extrapolated (X)	Reference RfC extrapolated (X)
		Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	(unitless)	(°C)	(°K)	(°K)	(cal/mol)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(X)	(X)
56235	Carbon tetrachloride	1.74E+02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	25	624.24	885.73	14,000	1.0E-04	7.0E-04
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	25	596.55	839.36	15,000	3.7E-04	1.1E-03
60297	Ethyl ether	5.73E-00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	25	329.20	508.10	6,955	0.0E+00	3.5E-01
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	25	613.32	842.25	17,000	4.6E-03	1.8E-04
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	25	329.71	536.40	6,988	2.3E-05	0.0E+00
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	25	458.00	695.00	9,510	4.0E-06	3.5E-03
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	25	353.24	562.16	7,342	7.8E-06	0.0E+00
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	25	347.24	545.00	7,136	0.0E+00	2.2E+00
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	25	651.02	848.49	16,000	0.0E+00	1.8E-02
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	25	636.44	860.38	15,000	9.7E-05	0.0E+00
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	25	276.71	467.00	5,714	0.0E+00	5.0E-03
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	25	249.00	416.25	5,115	1.0E-06	9.0E-02
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	25	299.00	456.70	6,676	0.0E+00	3.0E-03
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	25	370.00	583.00	7,868	0.0E+00	3.5E-02
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	25	285.30	460.40	5,879	8.3E-07	1.0E+01
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	25	259.25	432.00	5,250	8.8E-06	1.0E-01
75014	Vinyl chloride (chloroethylene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	25	354.60	545.50	7,110	0.0E+00	6.0E-02
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	25	293.10	466.00	6,157	2.2E-06	9.0E-03
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	25	319.00	552.00	6,391	0.0E+00	7.0E-01
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	25	283.60	469.00	6,104	1.0E-04	0.0E+00
75252	Bromofom	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	25	422.35	696.00	9,479	1.1E-06	7.0E-02
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	25	363.15	585.85	7,800	1.8E-05	7.0E-02
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	25	308.70	485.00	6,286	0.0E+00	1.0E-01
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	25	330.55	523.00	6,895	0.0E+00	5.0E-01
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	25	304.75	576.05	6,247	0.0E+00	2.0E-01
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	25	232.40	369.30	4,836	0.0E+00	5.0E+01
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	25	296.70	471.00	5,999	0.0E+00	7.0E-01
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	25	243.20	384.95	9,421	0.0E+00	2.0E-01
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	25	320.70	487.30	6,463	0.0E+00	3.0E+01
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E+01	6.05E+01	25	603.69	846.31	13,000	1.3E-03	1.8E-03
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	25	512.15	746.00	10,931	0.0E+00	2.0E-04
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	25	381.04	547.78	10,936	0.0E+00	1.1E+00
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	25	369.52	572.00	7,590	1.9E-05	4.0E-03
78933	Methyl ethyl ketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	25	352.50	536.78	7,481	0.0E+00	1.0E+00
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	25	386.15	602.00	8,322	1.6E-05	1.4E-02
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	25	360.36	544.20	7,505	1.1E-04	4.0E-02
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	25	329.80	506.70	7,260	0.0E+00	3.5E+00
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	25	419.60	661.15	8,996	5.8E-05	2.1E-01
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	25	393.20	594.00	8,383	2.7E-03	2.0E-02
80626	Methyl methacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	25	373.50	567.00	8,975	0.0E+00	7.0E-01
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	25	550.54	803.15	12,155	0.0E+00	2.1E-01
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	25	570.44	870.00	12,666	0.0E+00	1.4E-01
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	25	486.15	738.00	10,206	2.2E-05	7.0E-04
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	25	495.00	720.00	12,239	0.0E+00	3.5E-02

## VLOOKUP TABLES

91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02	X
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	X
95476 o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	7.0E-00	X
95501 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	
95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.80E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.87E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.89E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	9.00E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	
106934 1,2-Dibromoethane (ethylene dit)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.80	583.00	8,310	2.2E-04	2.0E-04	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	
108054 Vinyl acetate	5.26E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	
108101 Methylisobutylketone (4-methyl- <i>t</i> -butylketone)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	
108333 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	
108833 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	
111444 Bis(2-chloroethyl)ether	1.56E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-04	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	
126998 2-Chloro-1,3-butadiene (chloroprene)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	X
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	X
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.86	0.0E+00	3.0E-04	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	

*Soil Residential Benzene  
without 3 ft additional soil cover*

## DATA ENTRY SHEET

SL-ADV  
Version 3.0; 02/03

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES 

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES 

ENTER Initial  
Chemical soil  
CAS No. conc.,  
(numbers only,  
no dashes)  
 $C_R$   
( $\mu\text{g}/\text{kg}$ )

71432 5.00E+01

Chemical

Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor,	ENTER Depth below grade to top of contamination, (enter value of 0 if value is unknown)	ENTER Depth below grade to bottom of contamination, (Enter value or 0 if value is unknown)	ENTER Thickness of soil stratum A, (Enter value or 0)	ENTER Thickness of soil stratum B, (Enter value or 0)	ENTER Thickness of soil stratum C, (Enter value or 0)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^3$ )
10	15	60	169	80	0	S	

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, $\rho_s^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum A soil organic carbon fraction, $f_{oc}^A$ (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, $\rho_s^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B soil organic carbon fraction, $f_{oc}^B$ (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, $\rho_s^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C soil organic carbon fraction, $f_{oc}^C$ (unitless)
S	1.67	0.39	0.26	0.02										

MORE ↓

ENTER Enclosed space floor thickness, $L_{enc}$ ( $\text{cm}$ )	ENTER Enclosed space floor pressure differential, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^2$ )	ENTER Enclosed space floor length, $L_s$ ( $\text{cm}$ )	ENTER Enclosed space floor width, $W_s$ ( $\text{cm}$ )	ENTER Enclosed space height, $H_s$ ( $\text{cm}$ )	ENTER Floor-wall seam crack width, $w$ ( $\text{cm}$ )	ENTER Indoor air exchange rate, ER ( $1/\text{hr}$ )	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{sol}$ ( $\text{L}/\text{m}$ )
10	40	1000	1000	366	0.1	0.35	

ENTER Averaging time for carcinogens, AT <sub>c</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>nc</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	9	9	208	1.0E-06	1

Used to calculate risk-based soil concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, $D_a$ ( $\text{cm}^2/\text{s}$ )	Diffusivity in water, $D_w$ ( $\text{cm}^2/\text{s}$ )	Henry's law constant at reference temperature, $H$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant reference temperature, $T_R$ ( $^\circ\text{C}$ )	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_b$ ( $^\circ\text{K}$ )	Critical temperature, $T_c$ ( $^\circ\text{K}$ )	Organic carbon partition coefficient, $K_{oc}$ ( $\text{cm}^3/\text{g}$ )	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF	Reference conc., RfC ( $\mu\text{g}/\text{m}^3$ ) ( $\text{mg}/\text{m}^3$ )	Physical state at soil temperature, (S,L,G)
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	5.89E+01	1.79E+03	7.8E-06	0.0E+00	L

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_e$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_i$ ( $\text{cm}^2$ )	Stratum A relative air permeability, $k_g$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Floor-wall seam perimeter, $X_{\text{crack}}$ (cm)	Initial soil concentration used, $C_R$ ( $\mu\text{g}/\text{kg}$ )	Bldg. ventilation rate, $Q_{\text{building}}$ ( $\text{cm}^3/\text{s}$ )
2.84E+08	45	0.130	ERROR	ERROR	0.614	9.92E-08	0.246	2.44E-08	4,000	1.00E+00	3.56E+04

Area of enclosed space below grade, $A_B$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{\text{crack}}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{\text{eff}}^A$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{\text{eff}}^B$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{\text{eff}}^C$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{\text{eff,T}}$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)	Convection path length, $L_p$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	6.55E-04	0.00E+00	0.00E+00	6.55E-04	45	15

Soil-water partition coefficient, $K_d$ ( $\text{cm}^3/\text{g}$ )	Source vapor conc., $C_{\text{source}}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{\text{crack}}$ (cm)	Average vapor flow rate into bldg., $Q_{\text{soil}}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D_{\text{crack}}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{\text{crack}}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation	Infinite source indoor Pelet number, $\exp(Pe^f)$	Infinite source bldg. attenuation coefficient, $\alpha$	Infinite source bldg. conc., $C_{\text{building}}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source $\beta$ term	Finite source $\psi$ term	Time for source depletion, $\tau_D$ (sec)	Exposure duration > time for source depletion (YES/NO)
1.18E+00	8.58E+01	0.10	2.45E+01	6.55E-04	4.00E+02	#NUM!	NA	NA	NA	1.63E+00	1.66E-08	4.14E+08	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{\text{building}}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source bldg. conc., $C_{\text{building}}$ ( $\mu\text{g}/\text{m}^3$ )	Final finite source bldg. conc., $C_{\text{building}}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF	Reference conc., RfC
1.70E-04	NA	1.46E-02	1.46E-02	7.8E-06	NA

END

## RESULTS SHEET

## RISK-BASED SOIL CONCENTRATION CALCULATIONS:

## INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ( $\mu\text{g/kg}$ )	Indoor exposure soil conc., noncarcinogen ( $\mu\text{g/kg}$ )	Risk-based indoor exposure soil conc., ( $\mu\text{g/kg}$ )	Soil saturation $C_{\text{sat}}$ ( $\mu\text{g/kg}$ )	Final indoor exposure soil conc., ( $\mu\text{g/kg}$ )	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.20E+02	NA	1.20E+02	2.40E+06	1.20E+02	NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL  
DOWN  
TO "END"

END

## VLOOKUP TABLES

SCS Soil Type	Soil Properties Lookup Table						Bulk Density			
	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
C	0.61	0.01498	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.081	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

CAS No.	Chemical	Chemical Properties Lookup Table										Physical state at temperature, (S,L,G)	URF extrapolated (X)	RFC extrapolated (X)	
		Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Pure Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Pure Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Unit risk factor, URF conc., RFC (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference URF (mg/m <sup>3</sup> )		
56235 Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.80	7,127	1.5E-05	0.0E+00	L		
57749 Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	S	X	X
58899 gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	S		
60297 Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01	L		
60571 Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	S		
67641 Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	L		
67663 Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E-03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	L		
67721 Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	895.00	9,510	4.0E-06	3.5E-03	S		
71432 Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	L		
71556 1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00	L		
72435 Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	S	X	X
72559 DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	S		
74839 Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	G		
74873 Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02	L		
74908 Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E+03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	L		
74953 Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02	L	X	X
75003 Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	L		
75014 Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01	G		
75058 Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	L		
75070 Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03	L		
75092 Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	L		
75150 Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	L		
75218 Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00	L		
75252 Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	L	X	X
75274 Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	L		
75296 2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,266	0.0E+00	1.0E-01	L		
75343 1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01	L		
75354 1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01	L		
75456 Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01	L		
75694 Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	L		
75718 Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	L		
76131 1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	L		
76448 Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03	S		
77474 Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	L		
78831 Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	L		
78875 1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.51E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	L	X	X
78933 Methylmethiketone (2-butanone)	2.30E+05	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00	L		
79005 1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02	L	X	X
79016 Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	L	X	X
79209 Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	508.70	7,260	0.0E+00	3.5E+00	L		
79345 1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01	L		
79469 2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	L		
80626 Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	587.00	8,975	0.0E+00	7.0E-01	L		
83329 Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,165	0.0E+00	2.1E-01	S		
86737 Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,866	0.0E+00	1.4E-01	S		
87683 Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.18E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04	L		
88722 o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02	L		

## VLOOKUP TABLES

95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02		3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	L	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01		6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	L	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02		4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	L	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03		1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	L	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02		8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	L	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01		1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	L	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01		1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	L	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04		1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	S,L	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04		2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	L	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01		7.86E-03	25	409.34	617.20	8,501	1.1E-06	1.0E+00	L	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01		2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	L	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02		4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	L	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04		2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	L	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01		1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	L	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01		1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	L	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01		7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	L	X
106487 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02		2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	S	
106934 1,2-Dibromoethane (ethylene dibr)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02		7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	L	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00		7.34E-02	25	268.60	425.00	5,370	2.8E-04	0.0E+00	L	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03		1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	L	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02		9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	L	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03		1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	L	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02		5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	L	
108101 Methylsobutylketone (4-methyl-2-	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03		1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	L	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01		7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	L	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01		5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	L	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00		1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	L	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01		6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	L	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01		3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	L	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01		1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	L	X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01		5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	L	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01		1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	L	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04		1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	L	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E+01	4.58E-04		1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	S	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02		1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	S	X
120211 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02		1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	L	
123734 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04		1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	L	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.80E+03	3.20E-02		7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02		2.48E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	L	
126998 2-Chloro-1,3-butadiene (chloroprene)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01		1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	L	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01		1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00	L	
129009 Pyrene	1.05E+01	2.72E-02	7.24E-06	1.35E+00	4.50E-04		1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	S	X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04		1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	S	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01		1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	L	X
141785 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03		1.38E-04	25	350.26	523.3	7633.86	0.0E+00	3.2E+00	L	X
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01		4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	L	
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01		9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	L	X
205992 Benzo(b)fluoranthene	1.23E+06	2.28E-02	5.56E-06	1.50E-03	4.54E-03		1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	S	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03		9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	S	X
309002 Aldrin	2.45E+06	1.32E-02	4.88E-06	1.70E-02	6.95E-03		1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	S	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04		1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	S	X
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01		3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	L	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01		1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	L	X
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02		2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	L	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02		6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	L	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01		1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	L	

*Soil Residential Naphthalene  
without 3 ft additional soil cover*

## DATA ENTRY SHEET

SL-ADV  
Version 3.0; 02/03

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

 OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER Initial  
Chemical soil  
CAS No. conc.,  
(numbers only,  
no dashes)  
 $C_R$   
( $\mu\text{g}/\text{kg}$ )

Chemical

91203 5.40E+05

Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor.	ENTER Depth below grade to top of contamination, (enter value of 0 if value is unknown)	ENTER Totals must add up to value of $L_t$ (cell G28)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )			
Average soil temperature, $T_s$ ( $^{\circ}\text{C}$ )	$L_f$ ( $\text{cm}$ )	$L_t$ ( $\text{cm}$ )	$h_A$ ( $\text{cm}$ )	$h_B$ ( $\text{cm}$ )	$h_C$ ( $\text{cm}$ )		
10	15	60	169	60	0	0	S

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum A soil organic carbon fraction, $f_{oc}^A$ (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B soil organic carbon fraction, $f_{oc}^B$ (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C soil organic carbon fraction, $f_{oc}^C$ (unitless)
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S	1.67	0.39	0.26	0.02										
ENTER Enclosed space floor thickness, $L_{max}$ ( $\text{cm}$ )	ENTER Soil-bdg. pressure differential, $\Delta P$	ENTER Enclosed space length, $L_s$ ( $\text{cm}$ )	ENTER Enclosed space width, $W_s$ ( $\text{cm}$ )	ENTER Enclosed space height, $H_s$ ( $\text{cm}$ )	Floor-wall seam crack width, $w$ ( $\text{cm}$ )	Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg.							
10	40	1000	1000	366	0.1	0.35	OR							
							Leave blank to calculate $Q_{sol}$ ( $\text{L}/\text{m}$ )							

ENTER Averaging time for carcinogens, $AT_c$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{nc}$ (yrs)	ENTER Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
--	--	-----------------------------------	----------------------------------	--	---

70	9	9	208	1.0E-06	1
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Used to calculate risk-based soil concentration.

END

## CHEMICAL PROPERTIES SHEET

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_b$ (°K)	Critical temperature, $T_c$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Physical state at soil temperature, (S,L,G)
5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	3.0E-03	S

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum B soil air-filled porosity, $\theta_a^B$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum C soil air-filled porosity, $\theta_a^C$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A effective total fluid saturation, $S_{te}$ ( $\text{cm}^3/\text{cm}^3$ )	Stratum A soil intrinsic permeability, $k_t$ ( $\text{cm}^2$ )	Stratum A soil relative air permeability, $k_g$ ( $\text{cm}^2$ )	Stratum A soil effective vapor permeability, $k_v$ ( $\text{cm}^2$ )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Initial soil concentration used, $C_R$ ( $\mu\text{g/kg}$ )	Bldg. ventilation rate, $Q_{building}$ ( $\text{cm}^3/\text{s}$ )
2.84E+08	45	0.130	ERROR	ERROR	0.614	9.92E-08	0.246	2.44E-08	4,000	1.00E+00	3.56E+04

Area of enclosed space below grade, $A_b$ ( $\text{cm}^2$ )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ ( $\text{g/cm}\cdot\text{s}$ )	Stratum A effective diffusion coefficient, $D_{eff,A}$ ( $\text{cm}^2/\text{s}$ )	Stratum B effective diffusion coefficient, $D_{eff,B}$ ( $\text{cm}^2/\text{s}$ )	Stratum C effective diffusion coefficient, $D_{eff,C}$ ( $\text{cm}^2/\text{s}$ )	Total overall effective diffusion coefficient, $D_{eff,T}$ ( $\text{cm}^2/\text{s}$ )	Diffusion path length, $L_d$ (cm)	Convection path length, $L_p$ (cm)
1.06E+06	3.77E-04	15	12,913	1.52E-04	6.54E-03	1.75E-04	5.20E-04	0.00E+00	0.00E+00	5.20E-04	45	15

Soil-water partition coefficient, $K_d$ ( $\text{cm}^3/\text{g}$ )	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ ( $\text{cm}^3/\text{s}$ )	Crack effective diffusion coefficient, $D_{crack}$ ( $\text{cm}^2/\text{s}$ )	Area of crack, $A_{crack}$ ( $\text{cm}^2$ )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source $\beta$ term (unitless)	Finite source $\psi$ term (unitless)	Time for source depletion, $\tau_0$ (sec)	Exposure duration > time for source depletion, $(YES/NO)$
4.00E+01	1.63E-01	0.10	2.45E+01	5.20E-04	4.00E+02	#NUM!	NA	NA	1.50E+00	2.50E-11	2.62E+11	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Finite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Final finite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, $URF$ ( $RfC$ )	Reference conc., $URF$ ( $RfC$ )
2.29E-04	NA	3.73E-05	3.73E-05	NA	3.0E-03

**END**

## RESULTS SHEET

## RISK-BASED SOIL CONCENTRATION CALCULATIONS:

## INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ( $\mu\text{g}/\text{kg}$ )	Indoor exposure soil conc., noncarcinogen ( $\mu\text{g}/\text{kg}$ )	Risk-based indoor exposure soil conc., $C_{\text{sat}}$ ( $\mu\text{g}/\text{kg}$ )	Soil saturation soil conc., $C_{\text{sat}}$ ( $\mu\text{g}/\text{kg}$ )	Final indoor exposure soil conc., ( $\mu\text{g}/\text{kg}$ )	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.41E+05	1.41E+05	1.24E+06	1.41E+05	NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL  
DOWN  
TO "END"

END

VLOOKUP TABLES

Soil Properties Lookup Table							Bulk Density (g/cm³)	$\theta_w$ (cm³/cm³)	SCS Soil Name
SCS Soil Type	K <sub>s</sub> (cm/h)	$\alpha_t$ (1/cm)	N (unitless)	M (unitless)	n (cm³/cm³)	$\theta_r$ (cm³/cm³)	Mean Grain Diameter (cm)		
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

CAS No.	Chemical	Chemical Properties Lookup Table										Physical state at soil temperature, (S,L,G)	URF (X)	RFC (X)
		Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>b</sub> (°K)	Critical temperature, T <sub>c</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Unit risk factor, URF conc., RIC (µg/m <sup>3</sup> ) <sup>-1</sup>		
56235 Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	L	
57749 Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	S	X
58899 gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	S	X
60297 Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01	L	
60571 Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	S	X
67641 Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	L	
67663 Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	L	
67721 Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03	S	X
71432 Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	L	
71556 1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435 Methylchlorochloro	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	S	X
72559 DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	S	X
74839 Methyl bromide	1.05E+00	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	G	
74873 Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02	L	
74908 Hydrogen cyanide	3.80E+05	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	L	
74953 Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,888	0.0E+00	3.5E-02	L	X
75003 Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	L	
75014 Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01	G	
75058 Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	L	
75070 Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03	L	
75092 Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	L	
75150 Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	L	
75218 Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00	L	
75252 Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	L	X
75274 Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	L	X
75296 2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01	L	
75343 1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.81E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01	L	
75354 1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01	L	
75454 Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E-01	L	
75694 Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	L	
75718 Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	L	
76131 1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	L	
76448 Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E-02	25	603.69	846.31	13,000	1.3E-03	1.8E-03	S	X
77474 Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	L	
78831 Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	L	
78875 1,2-Dichloropropene	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	L	X
78933 MethylMethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	1.0E+00	L	
79005 1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02	L	
79016 Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	L	X
79209 Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00	L	X
79469 2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	L	
80626 Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	L	
83329 Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	S	X
86737 Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01	L	
87683 Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04	L	X
88722 o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02	L	
91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	S	
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02	S	X
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	S	X
95476 o-Xylene	3.63E+02	8.70E-02												

## VLOOKUP TABLES

95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	L	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.08E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,389	0.0E+00	6.0E-03	L	X
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	L	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.88E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	L	X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	L	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	L	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	L	X
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	S,L	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.80E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	L	X
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	1.1E-05	1.0E+00	L	X
100425 Styrene	7.78E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	L	X
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	L	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	L	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	L	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.36E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	L	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	7.0E+00	L	X
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	S	X
106934 1,2-Dibromoethane (ethylene dibr)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	L	X
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.80	425.00	5,370	2.8E-04	0.0E+00	L	X
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	L	X
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.8E-05	0.0E+00	L	X
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03	L	X
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	L	X
108101 Methylisobutylketone (4-methyl-2-)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	8.0E-02	L	X
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	L	X
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.87E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	L	X
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	L	X
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	L	X
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	L	X
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	L	X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	L	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	L	X
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	L	X
115297 Endosulfan	2.14E+03	1.15E-02	8.52E-06	5.10E+01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	S	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	S	X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	L	X
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	L	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	L	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	L	X
126998 2-Chloro-1,3-butadiene (chloroprene)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	L	X
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	3.0E-06	0.0E+00	L	X
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	S	X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	S	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	L	X
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	L	X
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	L	X
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	L	X
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	S	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	S	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	S	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.38	15000	1.8E-03	0.0E+00	S	X
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	L	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	L	X
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282325	7.4E-06	1.1E-01	L	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	L	X
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	L	X